SUMMARY

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Two controlled-release chemical formulations (a copolymer film and a polyester tablet) of organic tin compounds were biologically assayed for their efficacy as mosquito larvicides. Laboratory-bred third instar larvae of Culex pipiens L. were used in these studies. The results obtained are summarized as follows:

1. A controlled-release TBTI-MMA copolymer formulation was successfully prepared in the laboratory as films painted on PVC plates.

2. When accumulated toxicity was tested on the larvae a significant gradual increase in larval mortality was noticed till it reached 100% in the 10th week. When the plate was removed, the mortality was constant to the 14th week then a significant gradual decrease was observed till the 24th week when normal mortality was observed as in the untreated larvae.

3. When weekly toxicity was tested continuous fluctuations in larval mortality was noticed till the 24th week then a gradual decrease up to the 28th week occured when normal mortality was established.

4. The released toxic compounds from the copolymer formulation degradated into the non-toxic daughter compounds after about 8 weeks.

5. Both the acid and alkaline medium increased the rate of release of the toxic compounds from the copolymer formulation. However, the alkaline medium seemed to be significantly more effective in enhancing the release than the acidic medium.

6. Generally low temperature (10°C) decreased or almost stopped the release of the toxic compound from the copolymer formulation, however, at higher temperature (25°C) the release was significantly increased.

7. The copolymer formulation continued releasing its toxic compounds up to more than 24 weeks in the natural outdoor conditions.

8. When the accumulated amounts of tin released from the copolymer formulation were chemically assayed, a gradual increase was observed throughout the first 9 weeks, after which this amount was almost constant till the 21st week. However, when the water was changed weekly , the amount of tin showed irregular release from the copolymer formulation, giving a series of fluctuations throughout 21 weeks.

9. A cured polyester formulation was successfully prepared in the laboratory as tablets.

10. When accumulated toxicity released from the polyester formulation was bioassayed, a gradual increase in larval mortality was observed till the 3rd week and continued almost constant to the 9th week although the tablet was removed after the 7th week. Larval mortality then sharply decreased and equalled to that of the control after the 13th week.

11. When water was changed weekly, the released toxicity of polyester formulation showed a series of fluctuations in the first four weeks, then sharp decrease in the larval mortality was observed till the 7th week when the larval mortality equalled the larval mortality of the untreated control.

12. The released toxic compounds from the polyester formulation degradated into non-toxic daughter compounds after about 6 weeks.

13. When the accumulated amount of tin released from the polyester formulation was chemically assayed, this amount increased gradually throughout the first 7 weeks, after which it was almost constant till the 9th week. However, when water was changed weekly, the amount of released tin showed a gradual increase in the first four weeks, after which irregular release was observed till the 9th week.

14. The histopathological examination indicated that the TBTI-MMA copolymer formulation caused serious changes to the epithelial gut cells, muscles, fat bodies and Malpighian tubules.